SAMSUNG DISPLAY

Product Information

Customer : Quatius   DATE : Jun. 27. 2012

SAMSUNG TFT-LCD

MODEL : LTA550HJ13

The Information Described in this Specification is Preliminary and can be changed without prior notice

Samsung Display Co . , LTD.

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Revision History

Date	Rev. No	Page	Summary
Jun. 27. 2012	000	all	First issued

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General Description

Description

LTA550HJ13 is a color active matrix liquid crystal display (LCD) that uses amorphous silicon TFT(Thin Film Transistor) as switching components. This model is composed of a TFT LCD panel, a driver circuit and a back light unit. The resolution of a 55.0" is 1920 x 1080 and this model can display up to 1.07 Billion colors with wide viewing angle of 89° or higher in all directions. This panel is intended to support applications to provide a excellent performance for Flat Panel Display such as Home-alone Multimedia TFT-LCD TV and High Definition TV.

Features

- RoHS compliance (Pb-free)
- High contrast ratio & aperture ratio with wide color gamut
- SVA(Super Vertical Align) mode
- Wide viewing angle ($\pm 178°$)
- High speed response
- FHD resolution (16:9)
- Low Power consumption
- Edge Type LED (Light Emitted Diode) BLU
- DE (Data Enable) mode
- 4ch LVDS (Low Voltage Differential Signaling) interface

General Information

Items	Specification	Unit	Note
Module Size	1237.4 (H) x 711.3 (V)	mm	± 1.0mm
	34.7 (Dmax)		With converter
Weight	14600(Max)	g	
Pixel Pitch	0.630(H) x 0.630(W)	mm	
Active Display Area	1209.6(H) X 680.4(V)	mm	
Surface Treatment	Antiglare		
Display Colors	8bit + FRC	colors	
Number of Pixels	1920 x 1080	pixel	
Pixel Arrangement	RGB vertical stripe		
Display Mode	Normally Black		
Luminance of White	400 (Typ.)	cd/m^2	

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1. Absolute Maximum Ratings

If the condition exceeds maximum ratings, it can cause malfunction or unrecoverable damage to the device.

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{DD}	GND-0.3	13.2	V	(1)
Dimming Control	Max. Lum	-	5	V	
Storage temperature (Temperature of glass surface)	T_{STG}	-20	65	℃	(2), (5)
Operating temperature	T_{OPR}	0	50	℃	(2)
Shock (non - operating)	X,Y,Z	-	30	G	(3)
Vibration (non - operating)	V_{NOP}	-	1.5	G	(4)

Note (1) Ta= 25 $\pm$ 2 °C

    (2) Temperature and relative humidity range are shown in the figure below.
       a. 90 % RH Max. (Ta ≤ 39 °C)
       b. Relative Humidity is 90% or less. (Ta > 39 °C)
       c. No condensation
    (3) 11ms, sine wave, one time for $\pm$X, $\pm$Y, $\pm$Z axis
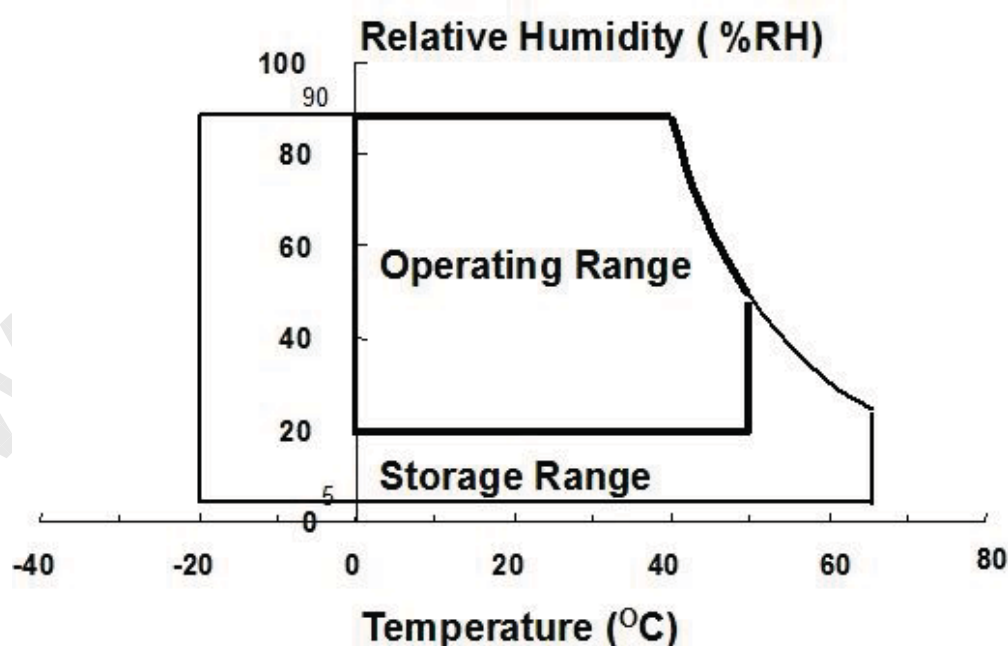   (4) 10-300 Hz, Sweep rate 10min, 30min for X,Y,Z axis

Fig. Temperature and Relative humidity range

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2. Optical Characteristics

The optical characteristics should be measured in a dark room or equivalent.
Measuring equipment : TOPCON RD-80S, TOPCON SR-3, ELDIM EZ-Contrast

(Ta = 25 ± 2°C, VDD=12V,   fv= 120Hz, f_{DCLK} = 297MHz, LED Current = 160 mA)

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio (Center of screen)		C/R		3000	5000	-		(1) SR-3
Response Time	G-to-G	Tg		-	6	18	msec	(3) RD-80S
Luminance of White (Center of screen)		Y_L		350	400	-	cd/m²	(4) SR-3
Color Chromaticity (CIE 1931)	Red	Rx	Normal qL,R =0 qU,D =0 Viewing Angle	TYP. -0.03	0.640	TYP. +0.03		(5),(6) SR-3
		Ry			0.330			
	Green	Gx			0.300			
		Gy			0.600			
	Blue	Bx			0.150			
		By			0.060			
	White	Wx			0.280			
		Wy			0.290			
Color Gamut		-		-	70	-	%	(5) SR-3
Color Temperature		-		7000	10000	13000	K	
Viewing Angle	Hor.	q_L	C/R≥10	75	89	-	Degree	(6) EZ-Contrast
		q_R		75	89	-		
	Ver.	q_U		75	89	-		
		q_D		75	89	-		
White Brightness Uniformity (9 Points)		B_{uni}		-	-	30	%	(2) SR-3

- Test Equipment Setup

    The measurement should be executed in a stable, windless and dark room between
    40min and 60min after lighting the back light at the given temperature for stabilization
    of the back light. This should be measured in the center of screen.

    Environment condition : Ta = 25 ± 2 °C

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Photo detector	Field
SR-3	2°
RD-80S	1°

Photo detector

Field

SR-3 : 50㎝
RD-80S : 50㎝

TFT - LCD Module

LCD Panel

The center of the screen
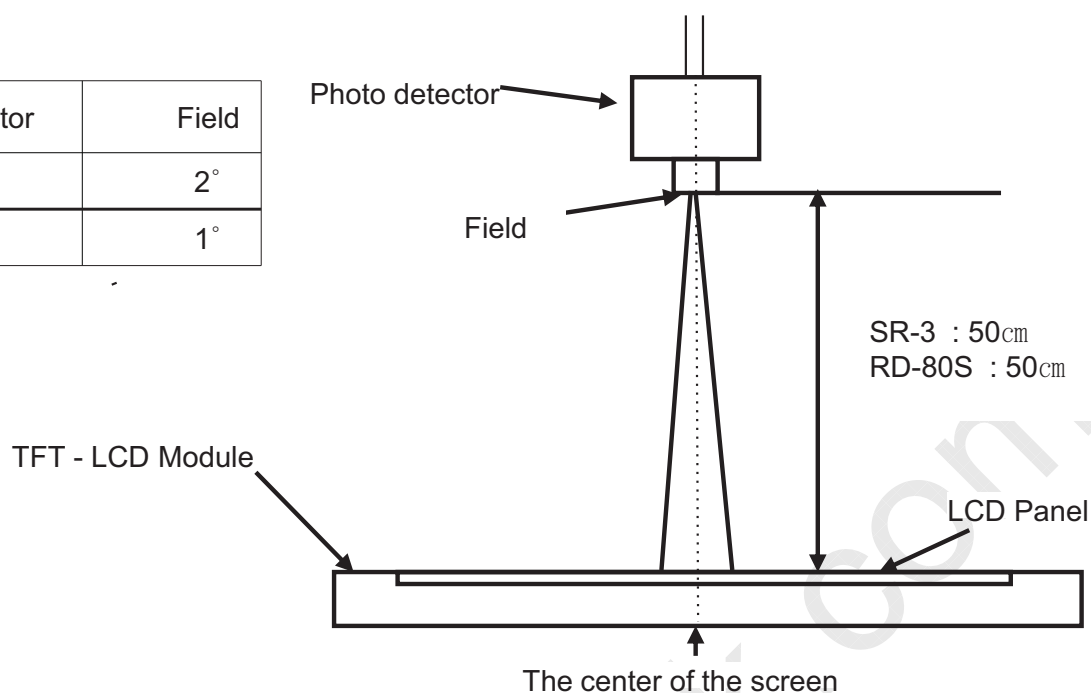
- Definition of test point

	320	960	1600
180	⑨	⑧	⑦
540	⑥	⑤	④
900	③	②	①

Active Area

◯ Test Point
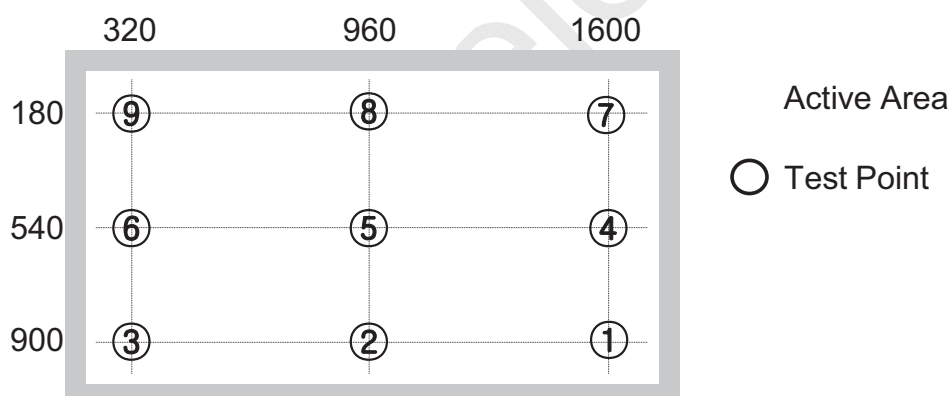
Note (1) Definition of Contrast Ratio (C/R)
        : Ratio of gray max (Gmax) & gray min (Gmin) at the center point ⑤ of the panel

$$C/R = \frac{G\max}{G\min}$$

Gmax : Luminance with all pixels white
Gmin : Luminance with all pixels black

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Note (2) Definition of 9 points brightness uniformity (Test pattern : Full White)

$$Buni = 100 * \frac{(B\max - B\min)}{B\max}$$

Bmax : Maximum brightness
Bmin : Minimum brightness

Note (3) Definition of Response time : Sum of Tr, Tf

Display data　　Black (data off)　　White (data on)　　Black (data off)

Optical Instruments Response

T_R　　T_F

100%
90%

10%
0%

TIME
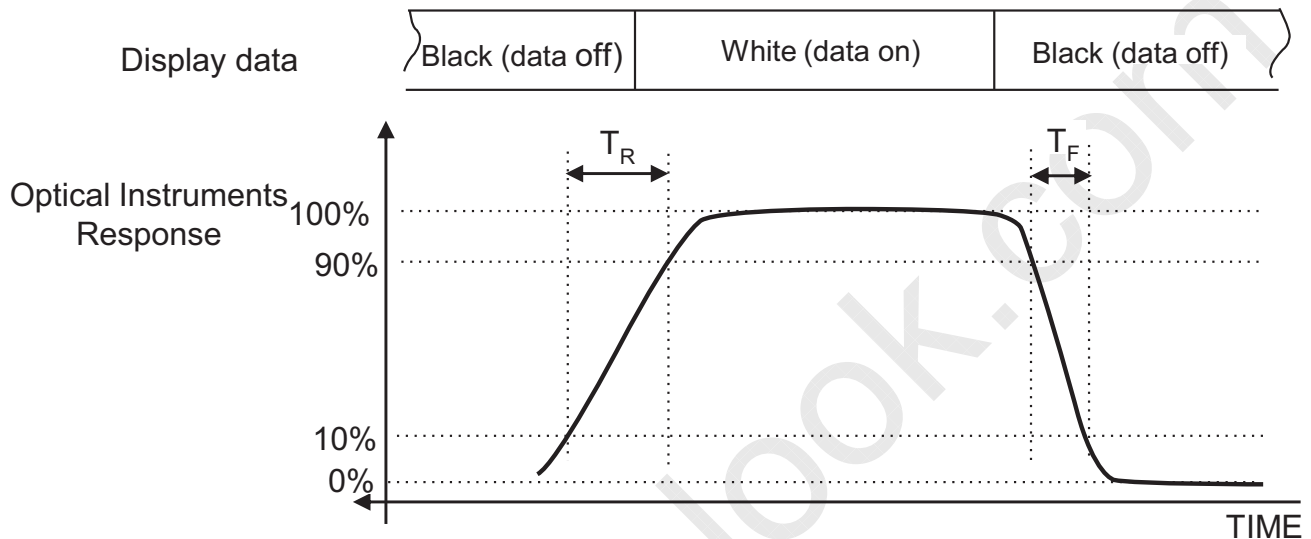
Note (4) Definition of Luminance of White : Luminance of white at center point ⑤

Note (5) Definition of Color Chromaticity (CIE 1931)
　　Color coordinate of Red, Green, Blue & White at center point ⑤

Note (6) Definition of Viewing Angle
　　: Viewing angle range (C/R ≥10)

Θ_U
Θ_R
Θ_L
Θ_D

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3. Electrical Characteristics

3.1 TFT LCD Module

The connector for display data & timing signal should be connected.

Ta = 25°C ± 2 °C

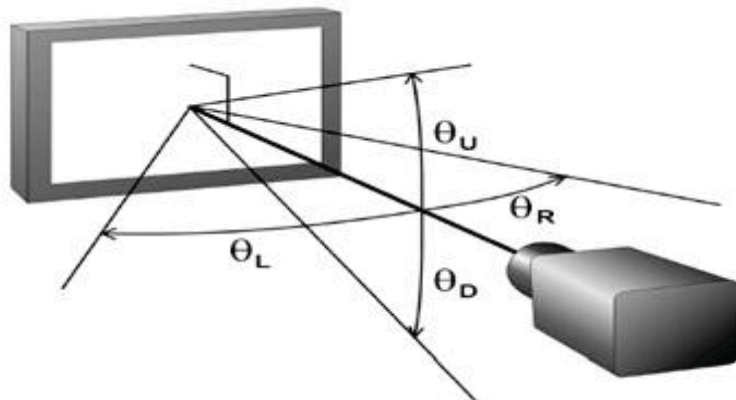| Item		Symbol	Min.	Typ.	Max.	Unit	Note
Voltage of Power Supply		V_{DD}	10.8	12.0	13.2	V	(1)
Current of Power Supply	(a) Black	I_{DD}	-	900	1000	mA	(2),(3)
	(b) White		-	1000	1100	mA	
	(c) N-PTN		-	1600	1900	mA	
Vsync Frequency		f_V	95	120	125	Hz	
Hsync Frequency		f_H	120	135	140	kHz	
Main Frequency		f_{DCLK}	260	297	305	MHz	
Rush Current		I_{RUSH}	-	-	8	A	(4)

Note (1) The ripple voltage should be controlled under 10% of V_{DD}.
(2) fV=120Hz, fDCLK = 297MHz, V_{DD} = 12.0V, DC Current.
(3) Power dissipation check pattern (LCD Module only)

a) Black Pattern　　　b) White Pattern　　　c) N-PTN
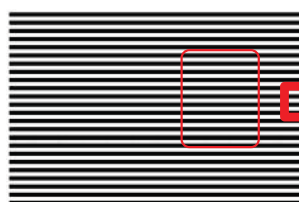
(4) Measurement Conditions

100%
90%

V_{DD}

10%
GND

T_{RUSH}=470μs
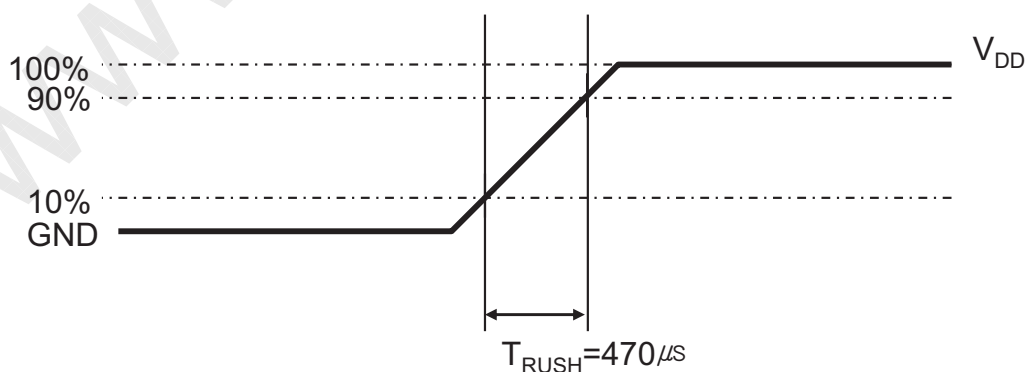
Rush Current I_{RUSH} can be measured when T_{RUSH}. is 470μs.

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3.2 Back Light Unit

The back light unit contains Edge type White LEDs (Light Emitting Diode)

Ta=25 $\pm$ 2°C
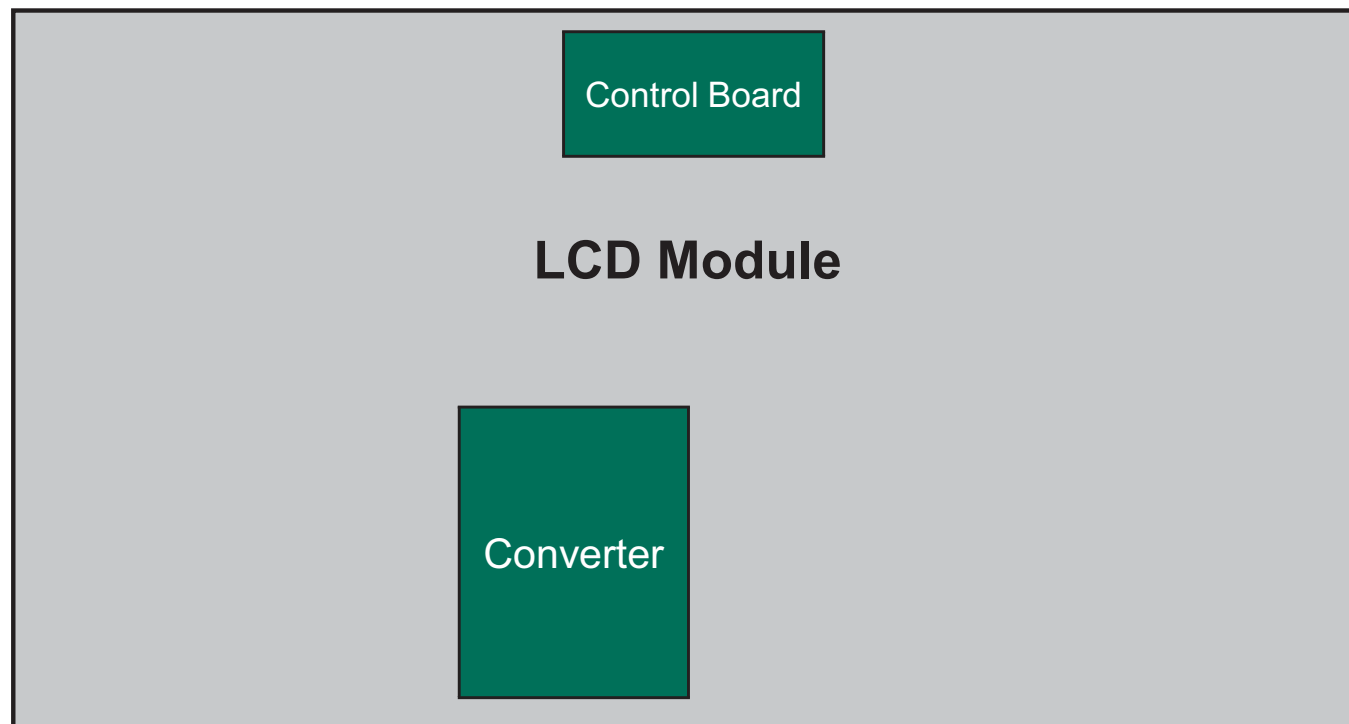
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Life Time	Hr	30,000	-	-	Hour	(1)

Note (1) It is defined as the time to take until the brightness reduces to 50% of its original

value.

[Operating condition : Ta = 25±2℃, For LED package only]

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3.3 Converter Input Condition & Specification

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Items	Symbol	Conditions	Specifications			Unit	Note
			Min.	Typ.	Max.		
Input Voltage	Vin	-	22	24	26	V	Ta=25±2 ℃
Input Current	I_{RUSH}	Vin=24.0V Vdim =3.3V	-	-	5.1	Adc	Normal mode
Output Current	I_O	Vin = 24.0V V dim =3.3 V	152	160	168	mAmean	
Backlight On/Off	ON	Vin=24.0 V	3	-	5.25	V	
	OFF	Vin=24.0 V	0	-	0.4		
Dimming Range	V_{DIM}	Vin :22~26V	0	-	3.3	V	Note(2) Pin#14 = N.C
Dimming Duty Output	D max	Vin=24V Dim:3.3V	-	-	100	%	
	D min	Vin=24V Dim:0V	1	-	-		
Dimming Frequency	F_{PWM}	Vin=24.0 V	140	150	160	Hz	
External Dimming Duty Range	EX_Dim	Vin=22.0~26.0 V Dim Pin(#13):floting	1	-	100	%	Note(2) Pin#13 = N.C
External Dimming Frequency Range	F_{EX_PWM}		140	-	150	Hz	
External Dimming Signal Level	V_{PWM}	High (ON)	3	-	5.25	V	
		Low (Off)	0	-	0.4		

Note (1) All data is measured after 120min warm-up.
Note (2) V_Dim and Ex_Dim are available only at Normal 2D mode.
Note (3) Duty = On / (On+Off) * 100
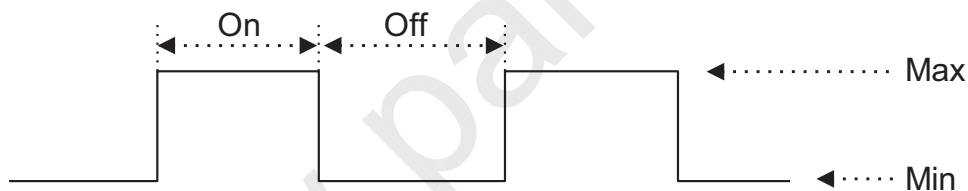
- Additional Appendix for Supply Current

Items	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Current	Iin _ overshoot	Vin = 24V, Dim=3.3V (Within 1hr at BLU on)	-	3.88	3.99	A
	Iin _ saturation	Vin = 24V, Dim=3.3V (After 1hr Aging)	-	3.80	3.91	A
Power Consumption (Back light)	P _ Inrush	Vin=24.0V, Vdim = 3.3V	-	-	122.4	Watt
	P _ overshoot	Vin = 24V, Dim=3.3V (Within 1hr at BLU on)	-	93.12	95.76	Watt
	P _ saturation	Vin = 24V, Dim=3.3V (After 1hr Aging)	-	91.2	93.84	Watt

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4. Input Terminal Pin Assignment

4.1.1 Input Signal & Power   Connector : FI-RE41S-HF (JAE/UJU)

Pin	Description	Pin	Symbol	Description
1	Vdd(12V)	21		Rx1[3]P
2	Vdd(12V)	22		Rx1[4]N note(1)
3	Vdd(12V)	23		Rx1[4]P note(1)
4	Vdd(12V)	24		GND
5	Vdd(12V)	25		Rx3[0]N
6	No Connection	26		Rx3[0]P
7	GND	27		Rx3[1]N
8	GND	28		Rx3[1]P
9	GND	29	ODD LVDS SIGNAL	Rx3[2]N
10	ODD LVDS SIGNAL / Rx1[0]N	30		Rx3[2]P
11	Rx1[0]P	31		GND
12	Rx1[1]N	32		Rx3CLK-
13	Rx1[1]P	33		Rx3CLK+
14	Rx1[2]N	34		GND
15	Rx1[2]P	35		Rx3[3]N
16	GND	36		Rx3[3]P
17	Rx1CLK-	37		Rx3[4]N note(1)
18	Rx1CLK+	38		Rx3[4]P note(1)
19	GND	39		GND
20	Rx1[3]N	40		No Connection
		41		No Connection

No Connection: This PINS are only used for SAMSUNG internal using.

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4.1.2 Input Signal & Power 　　　　　Connector : FI-RE51S-HF (JAE/UJU)

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Pin	Description	Pin	Description
1	Vdd(12V)	26	Rx4[0]P
2	Vdd(12V)	27	Rx4[1]N
3	Vdd(12V)	28	Rx4[1]P
4	Vdd(12V)	29	Rx4[2]N
5	Vdd(12V)	30	Rx4[2]P
6	No Connection	31	GND
7	GND	32	Rx4CLK-
8	GND	33	Rx4CLK+
9	GND	34	GND
10	Rx2[0]N	35	Rx4[3]N
11	Rx2[0]P	36	Rx4[3]P
12	Rx2[1]N	37	Rx4[4]N note(1)
13	Rx2[1]P	38	Rx4[4]P note(1)
14	Rx2[2]N	39	GND
15	Rx2[2]P	40	No Connection
16	GND	41	No Connection
17	Rx2CLK-	42	No Connection
18	Rx2CLK+	43	No Connection
19	GND	44	No Connection
20	Rx2[3]N	45	LVDS Option note(2)
21	Rx2[3]P	46	No Connection
22	Rx2[4]N note(1)	47	No Connection
23	Rx2[4]P note(1)	48	No Connection
24	GND	49	No Connection
25	Rx4[0]N	50	No Connection
		51	No Connection

(Pins 10–24 left group labeled: EVEN LVDS SIGNAL)
(Pins 26–38 right group labeled: EVEN LVDS SIGNAL)

No Connection: These PINS are used only for SAMSUNG. (DO NOT CONNECT)

note(1) **[JEIDA]** If 8bit of LVDS signal input from Set.
　　　　　Keep [4] channel **level '0'** →

　　　　[Normal]10bit only

LVCC_33　　　　　RxX[X]P
　　　　　　　　　Pin No [23,38]
　　　　10kohm　　　　10kohm
　　　　(Pull_Up)　　　(Pull_Down)
RxX[X]N　　　　　GND
Pin No [22,37]

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Note (2) LVDS OPTION : If this PIN is HIGH (3.3 V) → Normal LVDS format **[10bit input only]**

LOW (GND) →   JEIDA LVDS format

SEQUENCE   : On = V_{DD}(T1) ≥ LVDS Option ≥ Interface Signal(T2)

OFF = Interface Signal(T3) ≥ LVDS Option ≥ V_{DD}

Vin

T2   T3

LVDS
Option

LVDS
Signal

LVDS Option Sequence
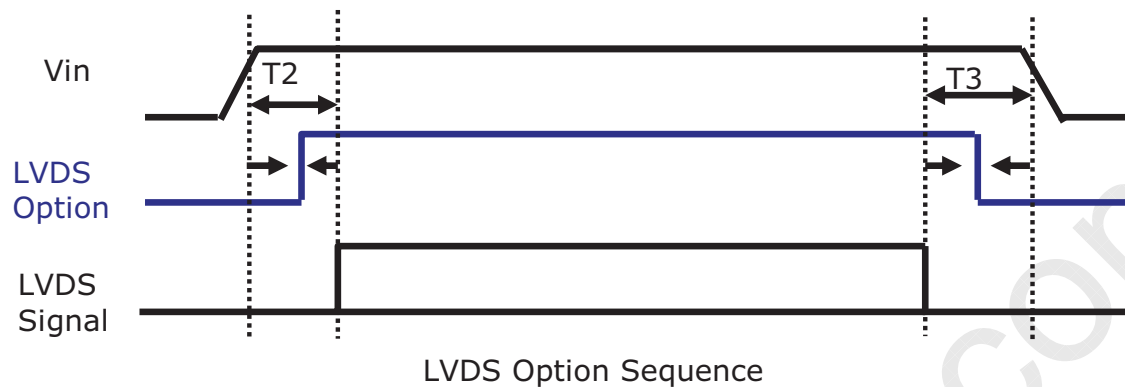
Note (3) Pin number starts from Left side

PCB

Pin No. 1   Pin No. 41   Pin No. 1   Pin No. 51

#1   #41   #1   #51

#1   #41   #1   #51
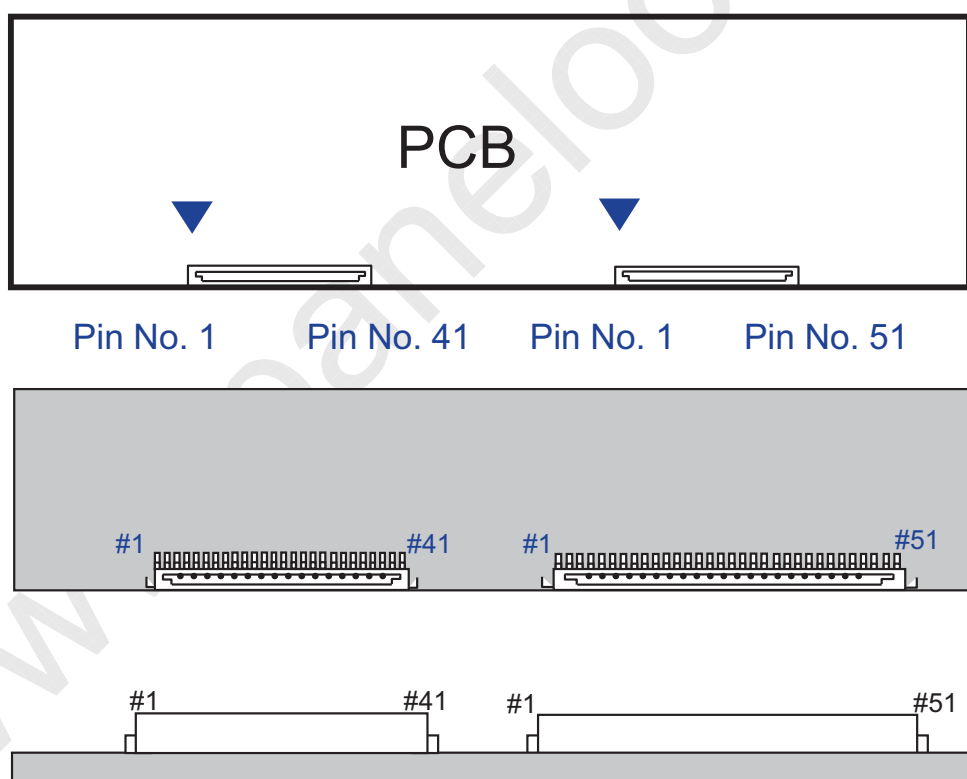
Fig. Connector diagram

a. All GND pins should be connected together and also be connected to the LCD's
    metal chassis.
b. All power input pins should be connected together.
c. All NC pins should be separated from other signal or power.

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4.2. Converter Input Pin Configuration

Connector : Yeon-ho, 20022WR-14B1

Pin No.	Pin Configuration(FUNCTION)
	Master
1 ~5	24 V
6~10	GND
11	No Connection
12	Backlight On /Off [ON:3.0 ~ 5.25 V, OFF: 0 ~ 0.4 V]
13	Dimming Control [0V:Min, 3.3V:Max] *Note(1)
14	External PWM [1~100 %] *Note(1)

Note(1) If use Dimming Control, Pin 14 Must be N.C
　　　　If use External PWM, Pin 13 Must be N.C

4.3. Converter Input Power Sequence

Note) SEQUENCE : ON = Vin(24V) > Dimming Control ≥ Backlight On/Off
　　　　　　　　OFF = Backlight On/Off ≥ Dimming Control > Vin(24V)

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4.4 LVDS Interface
- LVDS Receiver : T-con (merged)

	LVDS pin	JEIDA -DATA	Normal
TxOUT/RxIN0	TxIN/RxOUT0	R4	R0
	TxIN/RxOUT1	R5	R1
	TxIN/RxOUT2	R6	R2
	TxIN/RxOUT3	R7	R3
	TxIN/RxOUT4	R8	R4
	TxIN/RxOUT6	R9	R5
	TxIN/RxOUT7	G4	G0
TxOUT/RxIN1	TxIN/RxOUT8	G5	G1
	TxIN/RxOUT9	G6	G2
	TxIN/RxOUT12	G7	G3
	TxIN/RxOUT13	G8	G4
	TxIN/RxOUT14	G9	G5
	TxIN/RxOUT15	B4	B0
	TxIN/RxOUT18	B5	B1
TxOUT/RxIN2	TxIN/RxOUT19	B6	B2
	TxIN/RxOUT20	B7	B3
	TxIN/RxOUT21	B8	B4
	TxIN/RxOUT22	B9	B5
	TxIN/RxOUT24	HSYNC	HSYNC
	TxIN/RxOUT25	VSYNC	VSYNC
	TxIN/RxOUT26	DE	DE
TxOUT/RxIN3	TxIN/RxOUT27	R2	R6
	TxIN/RxOUT5	R3	R7
	TxIN/RxOUT10	G2	G6
	TxIN/RxOUT11	G3	G7
	TxIN/RxOUT16	B2	B6
	TxIN/RxOUT17	B3	B7
	TxIN/RxOUT23	RESERVED	RESERVED
TxOUT/RxIN4	TxIN/RxOUT28	R0	R8
	TxIN/RxOUT29	R1	R9
	TxIN/RxOUT30	G0	G8
	TxIN/RxOUT31	G1	G9
	TxIN/RxOUT32	B0	B8
	TxIN/RxOUT33	B1	B9
	TxIN/RxOUT34	RESERVED	RESERVED

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4.5 Input Signals, Basic Display Colors and Gray Scale of Each Color

COLOR	DISPLAY (10bit)	DATA SIGNAL																														GRAY SCALE LEVEL
		RED										GREEN										BLUE										
		R0	R1	R2	R3	R4	R5	R6	R7	R8	R9	G0	G1	G2	G3	G4	G5	G6	G7	G8	G9	B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	BLUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	-
	GREEN	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	-
	CYAN	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
	RED	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	MAGENTA	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	-
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	-
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
GRAY SCALE OF RED	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R0
	DARK ↑	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1
		0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R2
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	R3~ R1020
	↓	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	LIGHT	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1021
		0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1022
	RED	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1023
GRAY SCALE OF GREEN	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G0
	DARK ↑	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G1
		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G2
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	G3~ G1020
	↓	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	LIGHT	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	G1021
		0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	G1022
	GREEN	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	G1023
GRAY SCALE OF BLUE	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	B0
	DARK ↑	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	B1
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	B2
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	B3~ B1020
	↓	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
	LIGHT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	B1021
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	B1022
	BLUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	B1023

Note) Definition of Gray :
Rn : Red Gray, Gn : Green Gray, Bn : Blue Gray (n = Gray level)
Input Signal : 0 = Low level voltage, 1 = High level voltage

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5. Interface Timing

5.1 Timing Parameters （DE mode）

SIGNAL	ITEM	SYMBOL	MIN.	TYP.	MAX.	Unit	NOTE
Clock		$1/T_C$	260	297	305	MHz	-
Hsync	Frequency	F_H	120	135	140	KHz	-
Vsync		F_V	95	120	125	Hz	-
Vertical Display Term	Active Display Period	T_{VD}	-	1080	-	Lines	-
	Vertical Total	T_V	1110	1125	1350	Lines	-
Horizontal Display Term	Active Display Period	T_{HD}	-	1920	-	Clocks	-
	Horizontal Total	T_H	2092	2200	2348	clocks	-

Note) This product is DE mode. But the Hsync & Vsync signal must be inputted

    (1) Test Point : TTL control signal and CLK at LVDS Tx input terminal in system
    (2) Internal VDD = 3.3V
    (3) Spread spectrum
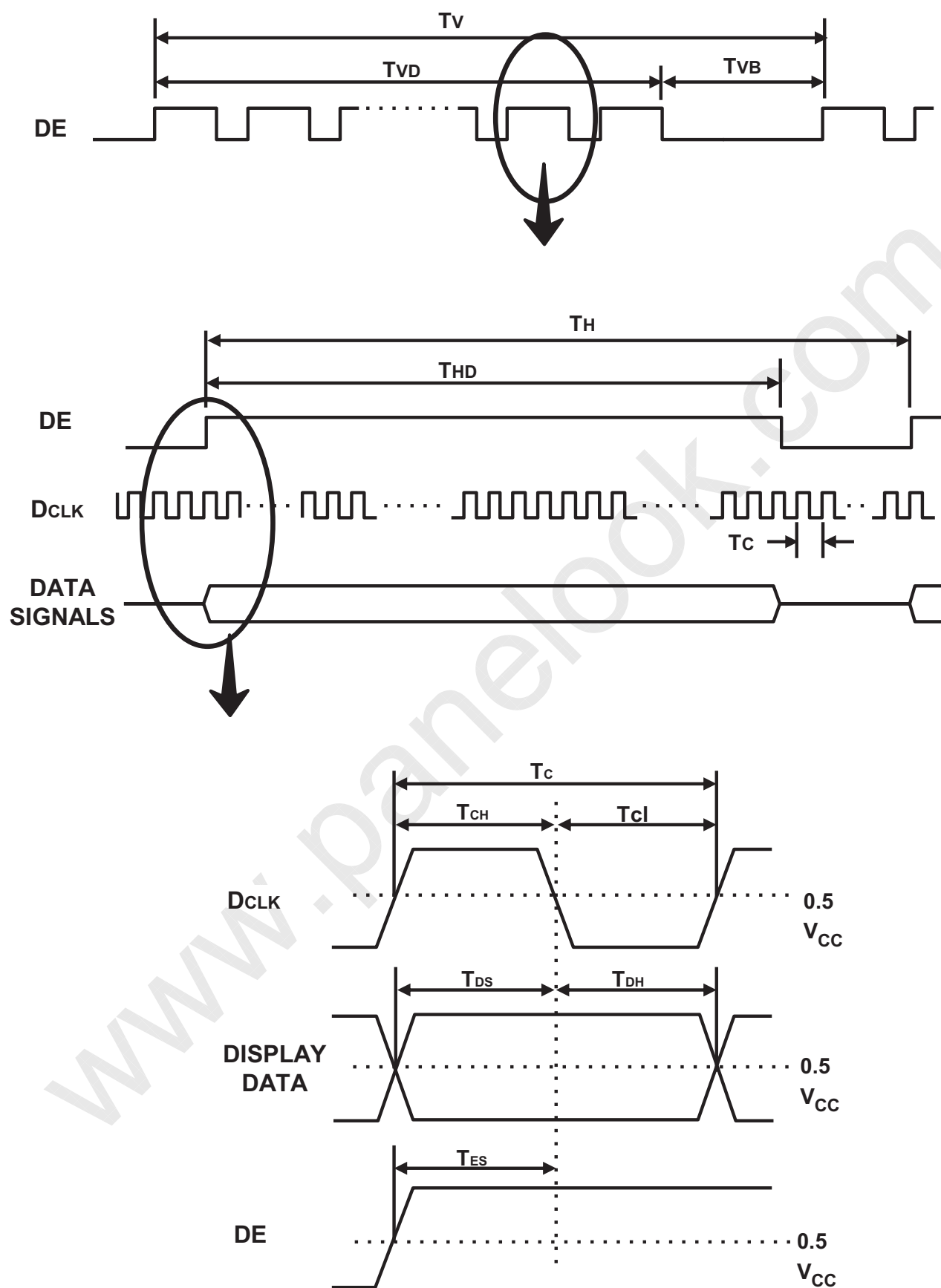   - Modulation Frequency : 30~150KHz
     * The limit of spread spectrum's range of SET in which the LCD module is
        assembled should be within $\pm$ 3 %.

5.2 LVDS Input Data Characteristics

SYMBOL	ITEM		Min.	Typ.	Max.	UNIT	NOTE
t_{RSRM}	Input Data Position	F_{IN}=85MHz	-	-	400	ps	-
		F_{IN}=78MHz	-	-	450		
		F_{IN}=75MHz	-	-	500		
t_{RSLM}	Input Data Position	F_{IN}=85MHz	-400	-	-		
		F_{IN}=78MHz	-450	-	-		
		F_{IN}=75MHz	-500	-	-		
V_{CM}	Input common mode voltage		0.4	-	2.4	V	-
$|V_{ID}|$	Differential Input Voltage		100	-	600	mV	-

Note) When the skew is measured the Spread Spectrum should be 0%

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5.3 Timing diagrams of interface signal (DE mode)

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5.4 Power ON/OFF Sequence

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To prevent a latch-up or DC operation of the LCD Module, the power on/off sequence should be as the diagram below.

1ms<T1≤10ms
1ms<T2≤50ms
0<T3≤50ms
1000ms≤T4

1000ms≤T5
(Recommend Value)
100ms≤T6
(Recommend Value)
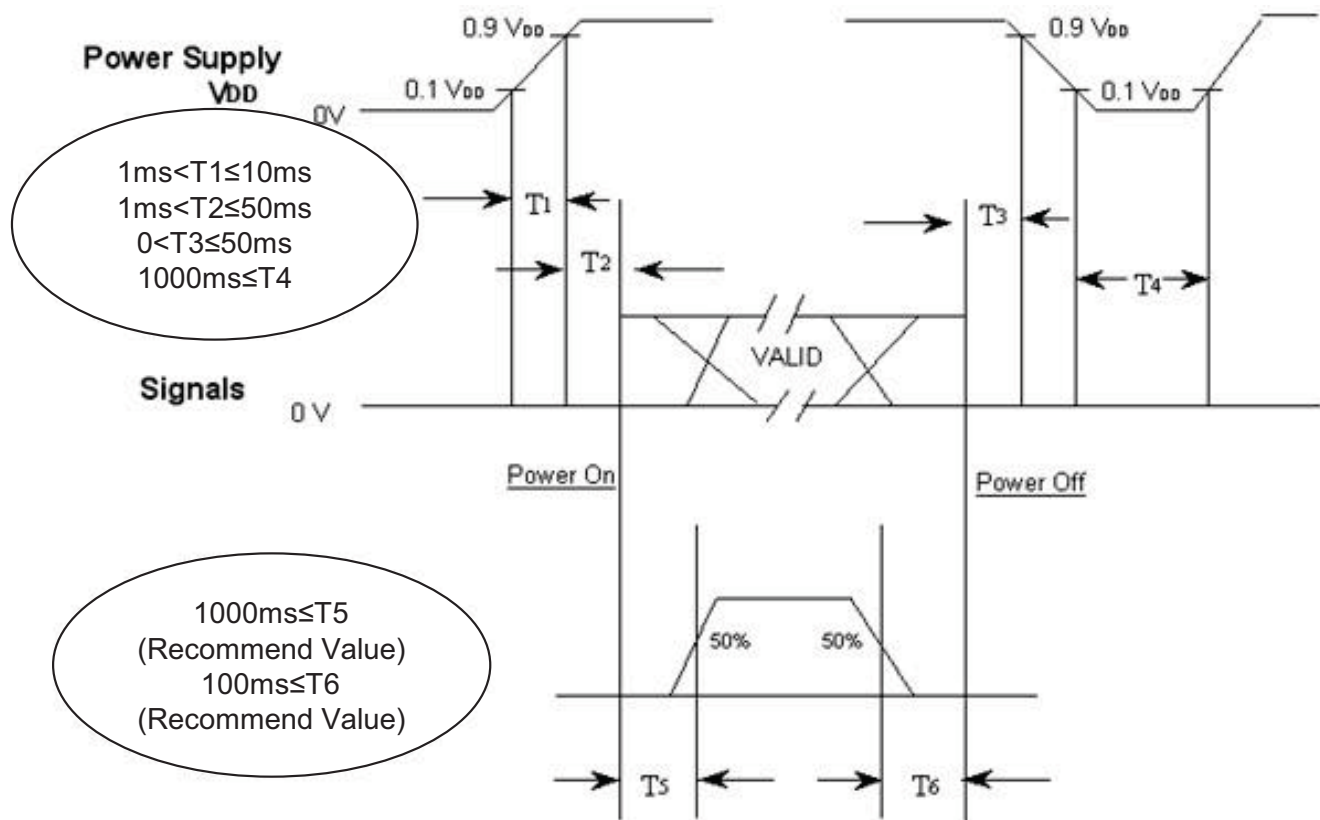
T1 : V_{DD} rising time from 10% to 90%
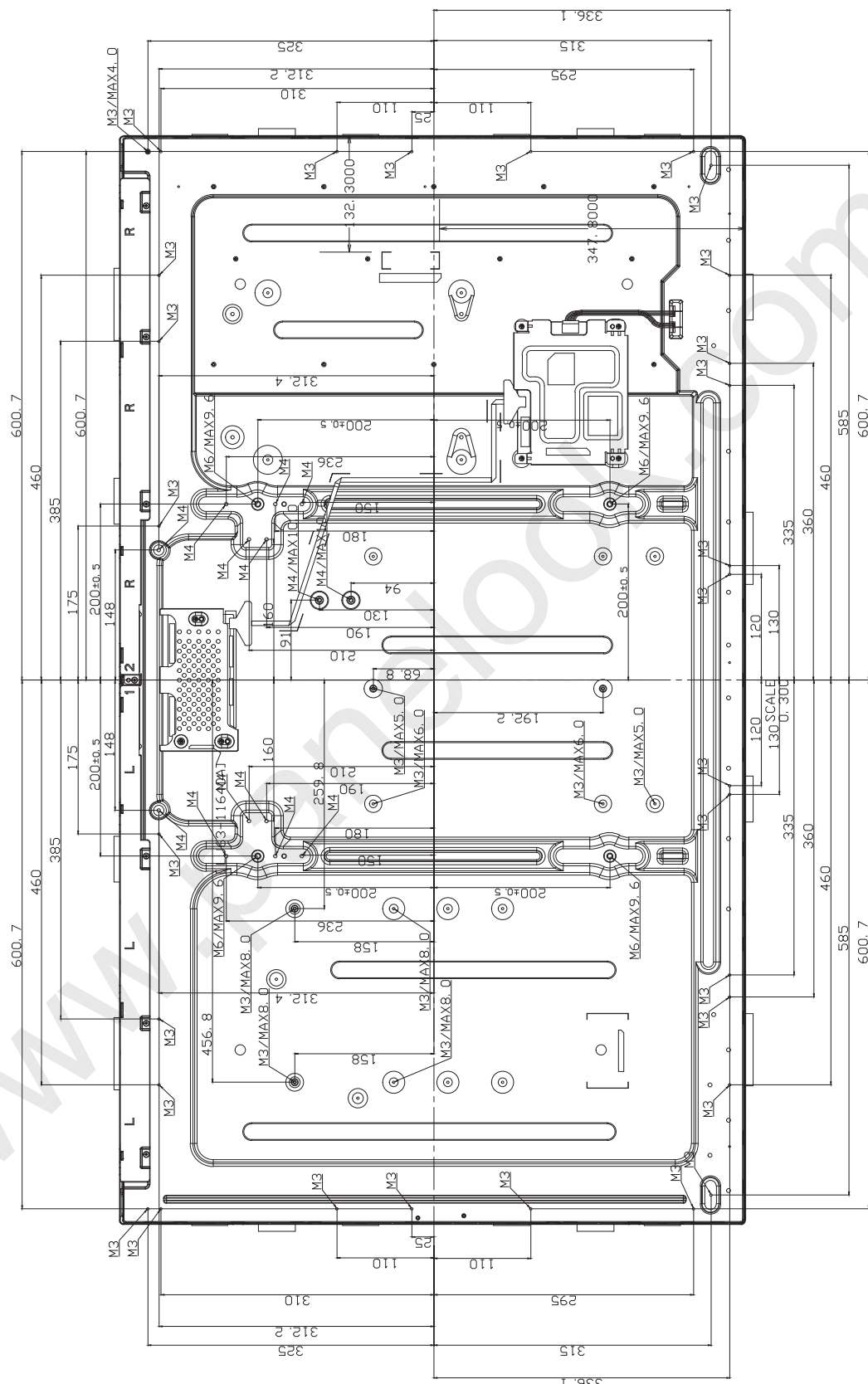T2 : The time from V_{DD} to valid data at power ON.
T3 : The time from valid data off to V_{DD} off at power Off.
T4 : V_{DD} off time for Windows restart
T5 : The time from valid data to B/L enable at power ON.
T6 : The time from valid data off to B/L disable at power Off.

- The supply voltage of the external system for the Module input should be the same as the definition of V_{DD}.
- Apply the lamp voltage within the LCD operation range. When the back light turns on before the LCD operation or the LCD turns off before the back light turns off, the display may momentarily show abnormal screen.
- In case of V_{DD} = off level, please keep the level of input signals low or keep a high impedance.
- T4 should be measured after the Module has been fully discharged between power off and on period.
- Interface signal should not be kept at high impedance when the power is on.
- In Case T5 is less than 1000msec and T6 is less than 100msec, Garbage Display can be seen. (It is not related to electrical function issue, Just for recommendation to prevent Garbage Display)

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SECTION A-A

ACTIVE CENTER

ACTIVE AREA

* NOTE
1. BACKLIGHT : WLED
2. CONNECTOR SPECIFICATION
   - LVDS INPUT CONNECTOR
     * 41PIN
     - MAKER : JAE, WETECH
     - 61PIN
     - PART NO. : 3711-005914
     - MAKER : JAE, WETECH
     - PART NO. : 3711-005925
3. USERHOLE
   - TAP SIZE & TOLERANCE DESIGNED FOR GENERAL PURPOSE METRIC
   - SCREW THREAD ACCORDING TO GENERAL GRADE OF "KS B 0211"
   - ALLOWED SCREW TORQUE
     > M3 TAP : 8.0 Kgf.cm MAX (5 TIMES)
     > M4 TAP : 13.0 Kgf.cm MAX (5 TIMES)
     > M8 TAP : 25.0 Kgf.cm MAX (5 TIMES)
     (SCREW REPEATED INSERTION WARRANTY : 5TIMES)
4. GAP BETWEEN TOP CHASSIS AND GLASS IS 1.2mm(MAX).
5. WEIGHT : g(MAX)
6. BLACK MATRIX SPEC
   - |A - B| ≤ 2.0 mm
   - |C - D| ≤ 2.0 mm

BLACK MATRIX

GENERAL TOLERANCE			
STEP	LEVEL 1	LEVEL 2	LEVEL 3
0 < X < 4	±0.05	±0.1	±0.2
4 < X < 16	±0.08	±0.15	±0.3
16 < X < 64	±0.12	±0.25	±0.5
64 < X < 256	±0.25	±0.4	±0.8

	DESCRIPTION OF REVISION		
REV	DATE		
DRWN BY	W.J.SON	CHK'D BY	W.J.SON
DES'D BY	W.J.SON	APP'D BY	W.J.SON

UNIT : mm
SCALE : N.S
TOLERANCE
LEVEL 3
2012.04.06

SAMSUNG DISPLAY

REASON			
MODEL NAME	LTA550HJ13-C		
PART/SHEET NAME	OUTLINE DIMENSION(FRONT)		
CODE NO.			
SPEC. NO			

CHG'D BY
SHEET 1/2
REV. 000

PART NAME: OUTLINE DIMENSION(FRONT)
CODE NO: LTA550HJ13-C
SPECIFICATION

7. PACKING

7.1 CARTON (Internal Package)

(1) Packing Form

Corrugated fiberboard box and EPS cushion as shock absorber

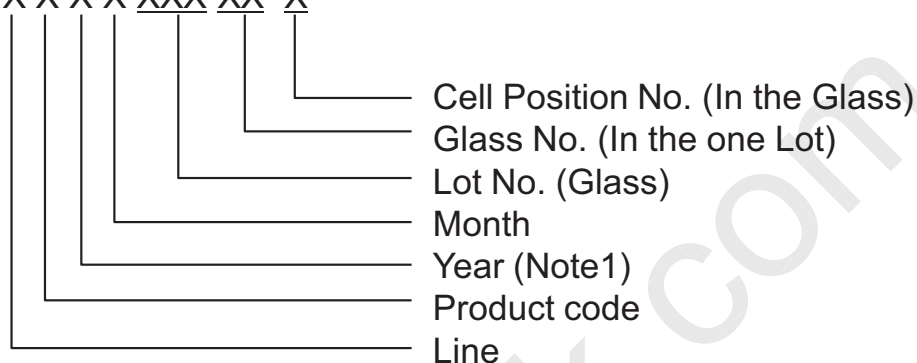(2) Packing Method

(22 modules/box)

Packing Box

Pallet Plastic
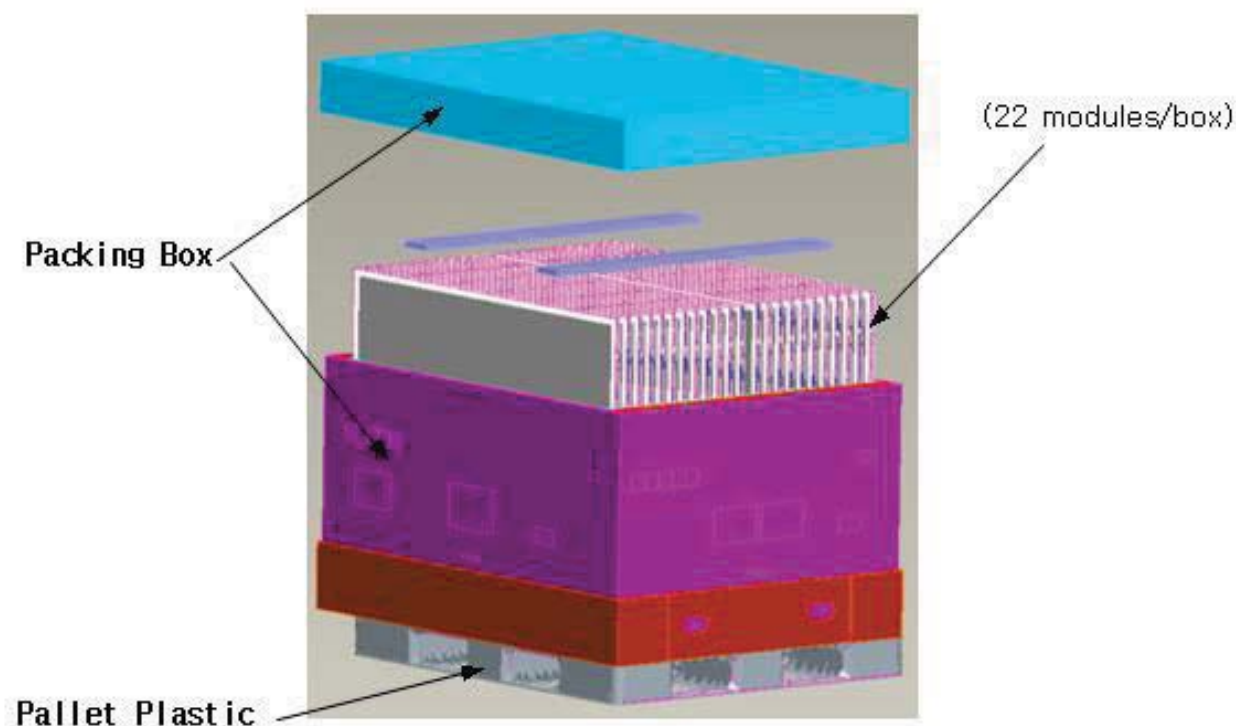
7.2 Packing Specification

Item	Specification	Remark
LCD Packing	22ea / Box	1. 13.6 Kg / LCD (22ea) 2. 32Kg / Packing Set 3. Packing Material Paper
Pallet	1Box / Pallet	9.3Kg
Packing Direction	Vertical	
Total Pallet Size	1133(L) x 1452(W) x 768(height)	
Total Pallet Weight	374.26Kg	Module(13.6x22kg) + pallet (9.3kg) + packing set (32kg) + desiccant (1.76kg)

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8. MARKING & OTHERS

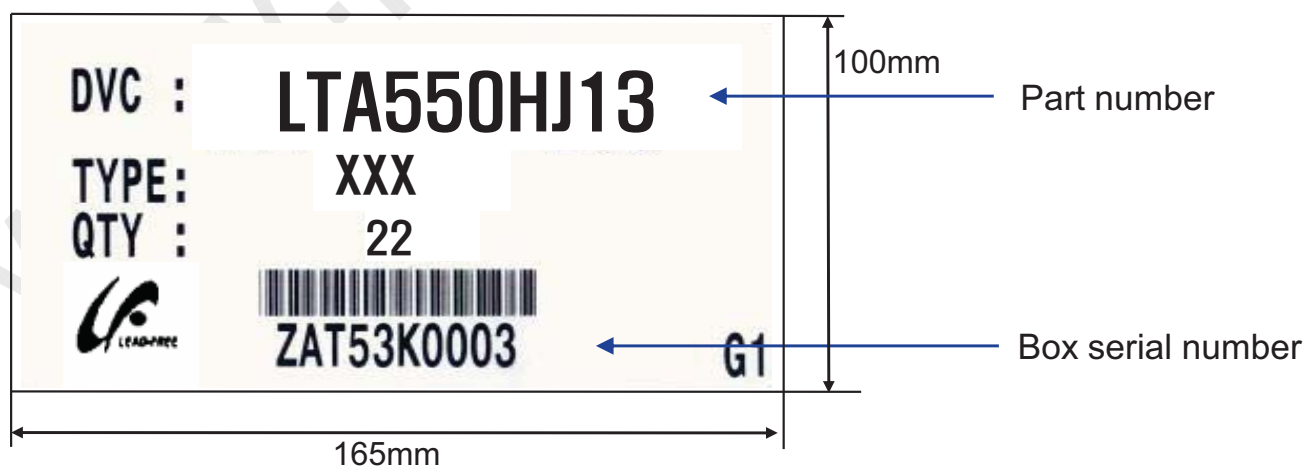A nameplate bearing followed by is affixed to a shipped product at the specified location on each product.

(1) Part number : LTA550HJ13
(2) Revision: Three letters
(3) Lot number : X X X X XXX XX X

- Cell Position No. (In the Glass)
- Glass No. (In the one Lot)
- Lot No. (Glass)
- Month
- Year (Note1)
- Product code
- Line

(4) Nameplate Indication

LTA550HJ13
0925
XXXX
XXXXXXXXXX   XXX
MADE IN KOREA

Week code : 09 25
- week
- year

40mm

80mm

Revision code
Lot number

(5) Packing box attach

DVC : **LTA550HJ13**
TYPE: XXX
QTY :   22
ZAT53K0003   G1

100mm

165mm

Part number

Box serial number
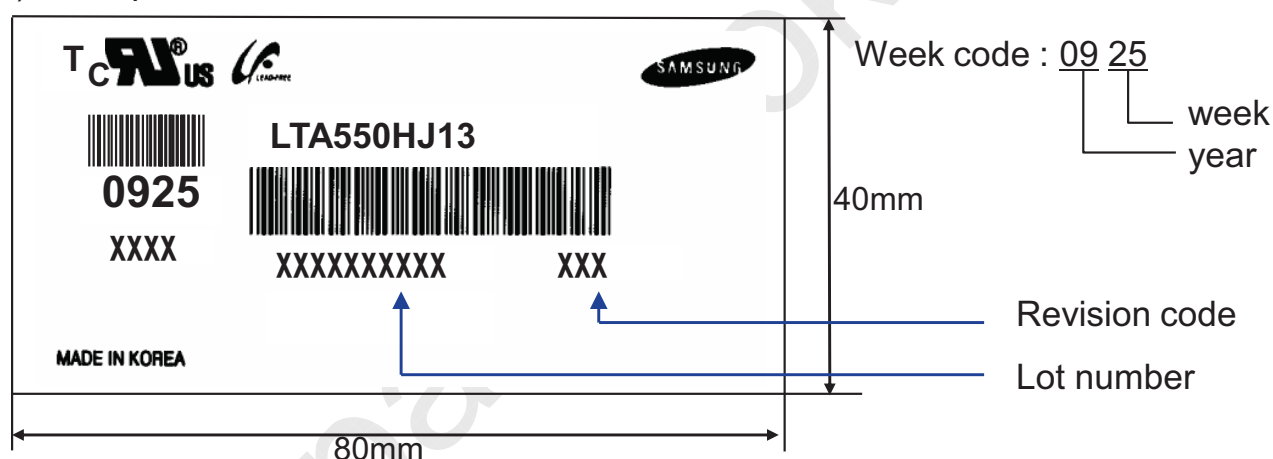
(6) Others
 1. After service part
    Lamps cannot be replaced because of the narrow bezel structure.

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9. General Precautions

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9.1 Handling

(a) When the Module is assembled, it should be attached to the system firmly using all mounting holes. Be careful not to twist and bend the Module.

(b) Because the converter use high voltage, it should be disconnected from power before it is assembled or disassembled.

(c) Refrain from strong mechanical shock and / or any force to the Module. In addition to damage, this may cause improper operation or damage to the Module and LED back light.

(d) Note that polarizers are very fragile and could be damage easily. Do not press or scratch the surface harder than a HB pencil lead.

(e) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining or discoloration may occur.

(f) If the surface of the polarizer is dirty, clean it using absorbent cotton or soft cloth.

(g) Desirable cleaners are water, IPA(Isopropyl Alcohol) or Hexane. Do not use Ketone type materials(ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(h) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth . In case of contact with hands, legs or clothes, it must be washed away with soap thoroughly.

(i) Protect the module from Electrostatic discharge. Otherwise the ASIC IC or semiconductor would be damaged.

(j) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(k) Do not disassemble the Module.

(l) Do not disassemble shield case of converter & LVDS board

(m) Do not connect N.C pins. (Samsung internal use only)

(n) Protection film for polarizer on the Module should be slowly peeled off just before use so that the electrostatic charge can be minimized. Must put on antistatic glove while handling a module

(o) Pins of I/F connector should not be touched directly with bare hands.

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9.2 Storage

ITEM	UNIT	Min.	Max.
Storage Temperature	(℃)	5	40
Storage Humidity	(%rH)	35	75
Storage Life	12 months		
Storage Condition	- The storage room should provide good ventilation and temperature control. - Products should not be placed on the floor, but on the Pallet away from a wall. - Prevent products from direct sunlight, moisture nor water; Be cautious of a build up of condensation. - Avoid other hazardous environment while storing goods. - If products delivered or kept in conditions of over the storage period of 3months, the recommended temperature or humidity range, we recommend you leave them at a temperature of 20℃ and a humidity of 50% for 24 hours.		

9.3 Operation

(a) Do not connect or disconnect the Module in the "Power On" condition.

(b) Power supply should always be turned on/off by the "Power on/off sequence"

(c) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference should be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.

(d) The cable between the back light connector and its converter power supply should be connected directly with a minimized length. A longer cable between the back light and the converter may cause lower luminance of LED package and may require higher startup voltage(Vs).

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9.4 Operation Condition Guide

(a) The LCD product should be operated under normal conditions.
　　Normal condition is defined as below;
　　　　- Temperature : 20±15℃
　　　　- Humidity : 55±20%
　　　　- Display pattern : continually changing pattern (Not stationary)

(b) If the product will be used in extreme conditions such as high temperature,
　　humidity, display patterns or operation time etc.., It is strongly recommended
　　to contact SEC for Application engineering advice. Otherwise, its reliability and
　　function may not be guaranteed. Extreme conditions are commonly found at
　　Airports, Transit Stations, Banks, Stock market, and Controlling systems.

9.5 Others

(a) Ultra-violet ray filter is necessary for outdoor operation.

(b) Avoid condensation of water. It may result in improper operation or disconnection
　　of electrode.

(c) Do not exceed the absolute maximum rating value. (supply voltage variation,
　　input voltage variation, variation in part contents and environmental temperature,
　　and so on)
　　Otherwise the Module may be damaged.

(d) If the Module keeps displaying the same pattern for a long period of time,
　　the image may be "sticked" to the screen.
　　To avoid image sticking, it is recommended to use a screen saver.

(e) This Module has its circuitry PCB's on the rear side and should be handled
　　carefully in order not to be stressed.

(f) Please contact SEC in advance when you display the same pattern for a long time.

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